

CLAIMS

1. A recording apparatus comprising:

5 a file generating section for receiving video data including a plurality of video unit data each representing a video and audio data related to the video data, generating a video data file by providing a plurality of video specific data to the plurality of video unit data, the plurality of video specific data for identifying the plurality of video
10 unit data, and generating an audio data file by providing audio specific data to the audio data, the audio specific data for identifying the audio data;

a dividing section for receiving the video data file and the audio data file, dividing the video data file into
15 a plurality of video data elements, and dividing the audio data file into a plurality of audio data elements related to the plurality of video data elements, wherein an i-th (i is an integer) video data element of the plurality of video data elements includes a predetermined number of video
20 unit data of the plurality of video unit data;

an arranging section for arranging the i-th video data element and an i-th audio data element related to the i-th video data element among the plurality of audio data elements such that the i-th audio data element and the i-th
25 video data element are recorded within a predetermined recording unit; and

a recording section for recording the arranged i-th video data element and the arranged i-th audio data element on an information recording medium.
30

2. A recording apparatus according to claim 1, wherein,
an I-th (I is an integer) video specific data for identifying the I-th video unit data of the plurality of

video unit data among the plurality of video specific data is provided to the I-th video unit data, and

the file generating section provides filler data and filler data specific data to the I-th video unit data, the
5 filler data specific data for identifying the filler data, and

a total size of the sum of the I-th video unit data, the I-th video specific data, the filler data and the filler data specific data is equal to an integer multiple the size
10 of a sector unit of the information recording medium.

3. A recording apparatus according to claim 1, wherein a header area is provided on the information recording medium, and

15 the arranging section outputs the audio specific data to the recording section such that the audio specific data is recorded in the header area.

4. A recording apparatus according to claim 1, wherein
20 the file generating section further receives metadata related to the video data and the audio data, and further generates a metadata file by providing metadata specific data to the metadata, the metadata specific data for identifying the metadata,

25 the dividing section divides the metadata file into a plurality of metadata elements related to the plurality of video data elements, and

the arranging section arranges an i-th metadata element related to the i-th video data element among the
30 plurality of metadata elements and the i-th audio data element such that they are arranged ahead of the i-th video data element within the predetermined recording unit.

5. A recording apparatus according to claim 4, wherein,
the file generating section further receives
auxiliary data including compressed video data which has
been compressed at a higher compressibility than the video
5 data, further generates an auxiliary data file by providing
auxiliary data specific data to the auxiliary data, the
auxiliary data specific data for identifying the auxiliary
data,

10 the dividing section divides the auxiliary data file
into a plurality of auxiliary data elements related to the
plurality of video data elements, and

the arranging section arranges an i-th auxiliary data
element related to the i-th video data element among the
plurality of auxiliary data elements and the i-th metadata
15 element such that they are adjacent to each other within
the predetermined recording unit.

6. A recording apparatus according to claim 5, wherein the
i-th auxiliary data element further includes compressed audio
20 data which has been compressed at a higher compressibility
than the video unit data.

7. A recording apparatus according to claim 5, wherein the
arranging section arranges the i-th auxiliary data element
25 ahead of the i-th video data element.

8. A recording apparatus according to claim 5, wherein the
arranging section arranges the auxiliary data element ahead
of the metadata element, the audio data element and the video
30 data element.

9. A recording apparatus according to claim 1, wherein
the file generating section further receives

auxiliary data including compressed video data which has been compressed at a higher compressibility than the video data, and further generates an auxiliary data file by providing auxiliary data specific data to the auxiliary data, the auxiliary data specific data for identifying the auxiliary data,

the dividing section divides the auxiliary data file into a plurality of auxiliary data elements related to the plurality of video data elements,

an i-th auxiliary data element of the plurality of auxiliary data elements is related to the i-th video data element,

the dividing section specifies a position in the video data file corresponding to a head of the i-th auxiliary data element, and

the dividing section divides the video data file such that a position, which is ahead of the specified position and which is spaced from the specified position by an integer multiple the size of an ECC block unit of the information recording medium, is a head of the i-th video data element.

10. A recording apparatus according to claim 1, wherein the file generating section further receives metadata related to the video data and the audio data, and further generates a metadata file by providing metadata specific data to the metadata, the metadata specific data for identifying the metadata,

the dividing section divides the metadata file into a plurality of metadata elements related to the plurality of video data elements,

an i-th metadata element of the plurality of metadata elements is related to the i-th video data element,

the dividing section specifies a position in the

metadata file corresponding to a head of the i-th video data element, and

5 the dividing section divides the metadata file such that a position, which is behind the specified position and which is spaced from the specified position by an integer multiple the size of an ECC block unit of the information recording medium, is a head of the i-th metadata element.

10 11. A recording apparatus according to claim 1, wherein the dividing section specifies a position in the audio data file corresponding to a head of the i-th video data element, and

15 the dividing section divides the audio data file such that a position, which is behind the specified position and which is spaced from the specified position by an integer multiple the size of the ECC block unit of the information recording medium, is a head of the i-th audio data element.

20 12. A recording apparatus according to claim 1, wherein when there exists a defective area on the information recording medium, the arranging section arranges rearrangement data for forming a rearrangement area used to rearrange predetermined data depending on the defective area, as well as the i-th video data element and the i-th audio data element, such that the rearrangement data is recorded within the predetermined recording unit.

30 13. A recording apparatus according to claim 1, wherein when there exists a defective area on the information recording medium, the arranging section arranges shift data for forming a shift area used to shift predetermined data depending on the defective area, as well as the i-th video data element and the i-th audio data element, such that the

shift data is recorded within the predetermined recording unit.

14. An information recording medium comprising:

5 video unit data representing a video;
 video specific data for identifying the video unit
data;

 filler data provided to the video unit data; and
 filler data specific data for identifying the filler
10 data,

 wherein a total size of the sum of the video unit
data, the video specific data, the filler data and the filler
data specific data is equal to an integer multiple the size
of a sector unit of the information recording medium.

15

15. An information recording medium on which a header area
is provided, comprising:

 audio data; and
 audio specific data for identifying the audio data,
20 wherein the audio specific data is recorded in the
header area.

16. An information recording medium comprising:

 a video data element including video unit data
25 representing a video;

 a metadata element related to the video data element;
and

 an audio data element related to the video data
element,

30 wherein the metadata element and the audio data
element are arranged ahead of the video data element within
a predetermined recording unit.

17. An information recording medium according to claim 16, wherein

the information recording medium further includes an auxiliary data element including compressed video data which has been compressed at a higher compressibility than the video unit data, the auxiliary data element being related to the video data element, and

the metadata element and the auxiliary data element are arranged such that they are adjacent to each other within the predetermined recording unit.

18. An information recording medium according to claim 17, wherein the auxiliary data element further includes compressed audio data which has been compressed at a higher compressibility than the video unit data.

19. An information recording medium according to claim 17, wherein the auxiliary data element is arranged ahead of the video data element.

20. An information recording medium according to claim 17, wherein the auxiliary data element is arranged ahead of the metadata element, the audio data element and the video data element.

21. An information recording medium comprising:

a plurality of video data elements obtained by dividing a video data file including a plurality of video unit data, each of the plurality of video unit data representing a video; and

a plurality of auxiliary data elements, each of the plurality of auxiliary data elements including compressed video data which has been compressed at a higher com-

pressibility than the plurality of video unit data, the plurality of auxiliary data elements being related to the plurality of video data elements,

5 wherein an i-th (i is an integer) video data element of the plurality of video data elements is related to an i-th auxiliary data element of the plurality of auxiliary data elements, and

10 a position in the video data file, which is ahead of a predetermined position corresponding to a head of the i-th auxiliary data element and which is spaced from the predetermined position by an integer multiple the size of an ECC block unit of the information recording medium, is a head of the i-th video data element.

15 22. An information recording medium comprising:

a plurality of video data elements including video data; and

a plurality of metadata elements obtained by dividing a metadata file including metadata related to the video data;

20 wherein an i-th (i is an integer) video data element of the plurality of video data elements is related to an i-th metadata element of the plurality of metadata elements, and

25 a position in the metadata file, which is behind a predetermined position corresponding to a head of the i-th video data element and which is spaced from the predetermined position by an integer multiple the size of an ECC block unit of the information recording medium, is a head of the i-th metadata element.

30

23. An information recording medium comprising:

a plurality of video data elements including video data; and

a plurality of audio data elements obtained by dividing an audio data file including audio data related to the video data,

5 wherein an i -th (i is an integer) video data element of the plurality of video data elements is related to an i -th audio data element of the plurality of audio data elements,

10 a position in the audio data file, which is behind a predetermined position corresponding to a head of the i -th video data element and which is spaced from the predetermined position by an integer multiple the size of an ECC block unit of the information recording medium, is a head of the i -th audio data element.

15 24. An information recording medium comprising:

a video data element including a plurality of video unit data, each of the plurality of video unit data representing a video; and

20 an audio data element related to the video data element,

wherein the information recording medium further comprises a rearrangement area,

25 when there exists a defective area on the information recording medium, the rearrangement area is used to rearrange predetermined data depending on the defective area.

25. An information recording medium comprising:

30 a video data element including a plurality of video unit data, each of the plurality of video unit data representing a video; and

an audio data element related to the video data element,

wherein the information recording medium further

comprises a shift area,

when there exists a defective area on the information recording medium, the shift area is used to shift predetermined data depending on the defective area.

5

26. An information recording medium according to claim 25, wherein the predetermined data is the video data element.

27. A recording method comprising the step of:

10 receiving video data including a plurality of video unit data each representing a video and audio data related to the video data, generating a video data file by providing a plurality of video specific data to the plurality of video unit data, the plurality of video specific data for
15 identifying the plurality of video unit data, and generating an audio data file by providing audio specific data to the audio data, the audio specific data for identifying the audio data;

receiving the video data file and the audio data file,
20 dividing the video data file into a plurality of video data elements, and dividing the audio data file into a plurality of audio data elements related to the plurality of video data elements, wherein an i-th (i is an integer) video data element of the plurality of video data elements includes
25 a predetermined number of video unit data of the plurality of video unit data;

arranging the i-th video data element and an i-th audio data element related to the i-th video data element among the plurality of audio data elements such that the
30 i-th audio data element and the i-th video data element are recorded within a predetermined recording unit; and

recording the arranged i-th video data element and the arranged i-th audio data element on an information

recording medium.

28. A recording method according to claim 27, wherein,

5 an I-th (I is an integer) video specific data for
identifying the I-th video unit data of the plurality of
video unit data among the plurality of video specific data
is provided to the I-th video unit data, and

10 the file generating step includes a step of providing
filler data and filler data specific data to the I-th video
unit data, the filler data specific data for identifying
the filler data, and

15 a total size of the sum of the I-th video unit data,
the I-th video specific data, the filler data and the filler
data specific data is equal to an integer multiple the size
of a sector unit of the information recording medium.

29. A recording method according to claim 27, wherein

 a header area is provided on the information recording
medium, and

20 the arranging step includes a step of outputting the
audio specific data to the recording section such that the
audio specific data is recorded in the header area.

30. A recording method according to claim 27, wherein

25 the step file generating step includes a step of
further receiving metadata related to the video data and
the audio data, and further generating a metadata file by
providing metadata specific data to the metadata, the
metadata specific data for identifying the metadata,

30 the dividing step includes a step of dividing the
metadata file into a plurality of metadata elements related
to the plurality of video data elements, and

 the arranging step includes a step of arranging an

i-th metadata element related to the i-th video data element among the plurality of metadata elements and the i-th audio data element such that they are arranged ahead of the i-th video data element within the predetermined recording unit.

5

31. A recording method according to claim 30, wherein,

the file generating step includes a step of further receiving auxiliary data including compressed video data which has been compressed at a higher compressibility than the video data, further generating an auxiliary data file by providing auxiliary data specific data to the auxiliary data, the auxiliary data specific data for identifying the auxiliary data,

the dividing step includes a step of dividing the auxiliary data file into a plurality of auxiliary data elements related to the plurality of video data elements, and

the arranging step includes a step of arranging an i-th auxiliary data element related to the i-th video data element among the plurality of auxiliary data elements and the i-th metadata element such that they are adjacent to each other within the predetermined recording unit.

32. A recording method according to claim 31, wherein the i-th auxiliary data element further includes compressed audio data which has been compressed at a higher compressibility than the video unit data.

33. A recording method according to claim 31, wherein the arranging step includes a step of arranging the i-th auxiliary data element ahead of the i-th video data element.

34. A recording method according to claim 31, wherein the

arranging step includes a step of arranging the auxiliary data element ahead of the metadata element, the audio data element and the video data element.

- 5 35. A recording method according to claim 27, wherein
the file generating step includes a step of further
receiving auxiliary data including compressed video data
which has been compressed at a higher compressibility than
the video data, and further generating an auxiliary data
10 file by providing auxiliary data specific data to the
auxiliary data, the auxiliary data specific data for
identifying the auxiliary data,
the dividing step includes a step of dividing the
auxiliary data file into a plurality of auxiliary data
15 elements related to the plurality of video data elements,
an i-th auxiliary data element of the plurality of
auxiliary data elements is related to the i-th video data
element,
the dividing step includes a step of specifying a
20 position in the video data file corresponding to a head of
the i-th auxiliary data element, and
the dividing step includes a step of dividing the
video data file such that a position, which is ahead of the
specified position and which is spaced from the specified
25 position by an integer multiple the size of an ECC block
unit of the information recording medium, is a head of the
i-th video data element.
- 30 36. A recording method according to claim 27, wherein
the file generating step includes a step of further
receiving metadata related to the video data and the audio
data, and further generating a metadata file by providing
metadata specific data to the metadata, the metadata specific

data for identifying the metadata,

the dividing step includes a step of dividing the metadata file into a plurality of metadata elements related to the plurality of video data elements,

5 an i-th metadata element of the plurality of metadata elements is related to the i-th video data element,

the dividing step includes a step of specifying a position in the metadata file corresponding to a head of the i-th video data element, and

10 the dividing step includes a step of dividing the metadata file such that a position, which is behind the specified position and which is spaced from the specified position by an integer multiple the size of an ECC block unit of the information recording medium, is a head of the
15 i-th metadata element.

37. A recording method according to claim 27, wherein

the dividing step includes a step of specifying a position in the audio data file corresponding to a head of
20 the i-th video data element, and

the dividing step includes a step of dividing the audio data file such that a position, which is behind the specified position and which is spaced from the specified position by an integer multiple the size of the ECC block
25 unit of the information recording medium, is a head of the i-th audio data element.

38. A recording method according to claim 27, wherein

when there exists a defective area on the information
30 recording medium, the arranging step further includes a step of arranging rearrangement data for forming a rearrangement area used to rearrange predetermined data depending on the defective area, as well as the i-th video data element and

the i-th audio data element, such that the rearrangement data is recorded within the predetermined recording unit.

39. A recording method according to claim 27, wherein

5 when there exists a defective area on the information recording medium, the arranging step further includes a step of arranging shift data for forming a shift area used to shift predetermined data depending on the defective area, as well as the i-th video data element and the i-th audio
10 data element, such that the shift data is recorded within the predetermined recording unit.

40. A recording apparatus comprising:

15 a file generating section for receiving a first contents data including a plurality of contents unit data each representing at least a part of first contents and a second contents data related to the first contents data, generating a first contents data file by providing a plurality
20 of first contents specific data to the plurality of the contents unit data, the plurality of first contents specific data for identifying the plurality of contents unit data, and generating a second contents data file by providing second contents specific data to the second contents data, the second contents specific data for identifying the second contents
25 data;

 a dividing section for receiving the first contents data file and the second contents data file, dividing the first contents data file into a plurality of first contents data elements, and dividing the second contents data file
30 into a plurality of second contents data elements related to the plurality of first contents data element, wherein an i-th (i is an integer) first contents data element of the plurality of first contents data elements includes a

predetermined number of contents unit data of the plurality of contents unit data;

5 an arranging section for arranging the i-th first contents data element and an i-th second contents data element related to the i-th first contents data element among the plurality of the second contents data elements such that the i-th second contents data element and the i-th first contents data element are recorded within a predetermined recording unit; and

10 a recording section for recording the arranged i-th first contents data element and the arranged i-th second contents data element on the information recording medium.

41. A recording apparatus according to claim 40, wherein
15 an I-th (I is an integer) first contents specific data for identifying the I-th contents unit data of the plurality of contents unit data among the plurality of first contents specific data is provided to the I-th contents unit data,

20 the file generating section provides filler data and filler data specific data to the I-th contents unit data, the filler data specific data for identifying the filler data, and

25 a total size of the sum of the I-th contents unit data, the I-th first contents specific data, the filler data and the filler data specific data is equal to an integer multiple the size of a sector unit of the information recording medium.

30 42. A recording apparatus according to claim 41, wherein the first contents is one of a video and an audio.

43. A recording apparatus according to claim 41, wherein

the I-th first contents specific data includes first key data which identifies a type of the I-th contents unit data and first length data which indicates a length of the I-th contents unit data, and

5 the filler data specific data includes second key data which identifies a type of the filler data and second length data which indicates a length of the filler data.

10 44. A recording apparatus according to claim 43, wherein the first contents is one of a video and an audio.

45. A recording apparatus according to claim 40, wherein a header area is provided on the information recording medium, and

15 the arranging section outputs the second contents specific data to the recording section such that the second contents specific data is recorded in the header area.

20 46. A recording apparatus according to claim 45, wherein the second content is one of a video and an audio.

47. A recording apparatus according to claim 45, wherein the second contents specific data includes key data which identifies a type of the second contents data and length data which indicates a length of the second contents data.

48. A recording apparatus according to claim 47, wherein the second contents is one of a video and an audio.

30 49. An information recording medium comprising:
 contents unit data representing at least a part of contents;
 contents specific data for identifying the contents

unit data;

filler data provided to the contents unit data; and
filler data specific data for identifying the filler
data,

5 wherein a total size of the sum of the contents unit
data, the contents specific data, the filler data and the
filler data specific data is equal to an integer multiple
the size of a sector unit of the information recording medium.

10 50. An information recording medium according to claim 49,
wherein the contents is one of a video and an audio.

51. An information recording medium according to claim 49,
wherein

15 the contents specific data includes first key data
which identifies a type of the contents unit data and first
length data which indicates a length of the contents unit
data, and

20 the filler data specific data includes second key
data which identifies a type of the filler data and second
length data which indicates a length of the filler data.

52. An information recording medium according to claim 51,
wherein the contents is one of a video and an audio.

25 53. An information recording medium on which a header area
is provided, comprising:

contents data representing at least a part of
contents; and

30 contents specific data for identifying the contents
data,

wherein the contents specific data is recorded in
the header area.

54. An information recording medium according to claim 53, wherein the contents is one of a video and an audio.

5 55. An information recording medium according to claim 53, wherein the contents specific data includes key data which identifies a type of the contents data and length data which indicates a length of the contents data.

10 56. An information recording medium according to claim 55, wherein the contents is one of a video and an audio.

57. A recording method comprising the steps of:

15 receiving a first contents data including a plurality of contents unit data each representing at least a part of first contents and a second contents data related to the first contents data, generating a first contents data file by providing a plurality of first contents specific data to the plurality of the contents unit data, the plurality of first contents specific data for identifying the plurality of contents unit data, and generating a second contents data file by providing second contents specific data to the second contents data, the second contents specific data for identifying the second contents data;

25 receiving the first contents data file and the second contents data file, dividing the first contents data file into a plurality of first contents data elements, and dividing the second contents data file into a plurality of second contents data elements related to the plurality of first contents data element, wherein an i-th (i is an integer) first contents data element of the plurality of first contents data elements includes a predetermined number of contents unit data of the plurality of contents unit data;

30

arranging the i-th first contents data element and an i-th second contents data element related to the i-th first contents data element among the plurality of the second contents data elements such that the i-th second contents data element and the i-th first contents data element are recorded within a predetermined recording unit; and

recording the arranged i-th first contents data element and the arranged i-th second contents data element on the information recording medium.

58. A recording method according to claim 57, wherein

an I-th (I is an integer) first contents specific data for identifying the I-th contents unit data of the plurality of contents unit data among the plurality of first contents specific data is provided to the I-th contents unit data,

the file generating step includes a step of providing filler data and filler data specific data to the I-th contents unit data, the filler data specific data for identifying the filler data, and

a total size of the sum of the I-th contents unit data, the I-th first contents specific data, the filler data and the filler data specific data is equal to an integer multiple the size of a sector unit of the information recording medium.

59. A recording method according to claim 58, wherein the first contents is one of a video and an audio.

60. A recording method according to claim 58, wherein

the I-th first contents specific data includes first key data which identifies a type of the I-th contents unit data and first length data which indicates a length of the

I-th contents unit data, and

the filler data specific data includes second key data which identifies a type of the filler data and second length data which indicates a length of the filler data.

5

61. A recording method according to claim 60, wherein the first contents is one of a video and an audio.

10

62. A recording method according to claim 57, wherein a header area is provided on the information recording medium, and

15

the arranging step includes a step of outputting the second contents specific data to the recording section such that the second contents specific data is recorded in the header area.

63. A recording method according to claim 62, wherein the second content is one of a video and an audio.

20

64. A recording method according to claim 62, wherein the second contents specific data includes key data which identifies a type of the second contents data and length data which indicates a length of the second contents data.

25

65. A recording method according to claim 64, wherein the second contents is one of a video and an audio.